

ZOOLOGY.—*Additional notes on Foraminifera in the collection of Ehrenberg.*¹
J. A. CUSHMAN, Sharon, Mass.

In the summer of 1927 a visit was made to study the Foraminifera in the Ehrenberg collection in Berlin to determine if possible the characters and relationships of the numerous genera erected by Ehrenberg between 1838 and 1872. Notes on some of these have already been published in this JOURNAL 17: 487-491, 1927. As noted previously, there are many excellent original drawings that were never published which, with the specimens themselves, serve to give the characters needed to determine the systematic position of these genera. Notes are here given on a number of these genera and their probable relationships.

Asterodiscus Ehrenberg, 1838 (Abh. Akad. Wiss. Berlin, 1838: 130). The genoholotype is *A. forskålii* Ehrenberg but is not figured. The type is from Santo Domingo and is the common species of that region. It should be placed as a synonym of *Planorbulina* d'Orbigny, 1826, and the species a synonym of *P. mediterraneensis* d'Orbigny.

Omphalophacus Ehrenberg, 1838 (Abh. Akad. Wiss. Berlin, 1838: 132). The first species is *O. hemprichii* Ehrenberg (*l. c.*, p. 132). There are two lots of specimens in the Ehrenberg collection labeled "Tor" and "Erraia," respectively, but nothing more as to locality. They represent an unequally bilateral species of *Amphistegina*. The later species, *O. ? tenellus* Ehrenberg (Mikrogeologie, 1854: pl. 32, pt. 2, fig. 34), was not found in the collection and is very difficult to determine from the figure. Its relationship was questioned by Ehrenberg himself. Therefore the genus *Omphalophacus* may be placed as a synonym of *Amphistegina* d'Orbigny, 1826.

Geoponus Ehrenberg, 1839 (Abh. Akad. Wiss. Berlin, 1839: 132). The genoholotype is *G. stella-borealis* Ehrenberg (*l. c.*, p. 132, pl. 1, figs. a-g). The type specimens are from living material from off Cuxhaven. In the Ehrenberg collection are excellent original figures in color showing pseudopodia. The large figures are in good detail with 8 to 10 retral processes to the

chamber and 12 chambers to a coil. The retral processes are in pairs. This is definitely a synonym of *Elphidium* Montfort, 1808.

Entrochus Ehrenberg, 1841 (Abh. Akad. Wiss. Berlin, 1841: 408). The genoholotype is *E. septatus* Ehrenberg (*l. c.*, p. 426). The type specimen was examined. It is from Recent material off Veracruz and is evidently a small *Cassidulina* and should be placed as a synonym under that genus.

Megathyra Ehrenberg, 1841 (Abh. Akad. Wiss. Berlin, 1841: 409). Ehrenberg named two species, *M. dilatata* and *M. planularia*. The type specimens of these were examined. Both are from Recent material off Veracruz. The first species is very difficult to make out as to its full characters, but the second is very definite and indicates that the genus should be placed as a synonym of *Planularia* Defrance, 1824.

Porospira Ehrenberg, 1844 (Ber. preuss. Akad. Wiss. Berlin, 1844: 75). Two species were named by Ehrenberg in 1844, *P. princeps* and *P. comes*. Both are from Oran and were later figured (Mikrogeologie, 1854: pl. 21, figs. 92, 93). In the book of drawings in the Ehrenberg collection the second species was later labeled "*Rotalia* Reuss, 1861" after the genus. A study of the type specimens shows them to be somewhat trochoid and probably representing a single species. They should be placed as synonyms under *Anomalina* d'Orbigny, 1826.

Spirobotrys Ehrenberg, 1844 (Ber. preuss. Akad. Wiss. Berlin, 1844: 247). The genoholotype is *S. aegaea* Ehrenberg (*l. c.*, p. 248), from the Aegean Sea. The type is very evidently, as was later marked in ink on the original drawing, "*Planorbulina mediterranea*." There are two excellent unpublished figures in the Ehrenberg collection and the genus is definitely a synonym of *Planorbulina* d'Orbigny, 1826.

Rhynchospira Ehrenberg, 1845 (Ber. preuss. Akad. Wiss. Berlin, 1845: 358). The genoholotype is *R. indica* Ehrenberg (*l. c.*, p. 376). The locality given is "Pulo Pinang." The type specimen definitely shows that it is a synonym of *Globigerina* d'Orbigny, 1826.

Clidostomum Ehrenberg, 1845 (Ber. preuss. Akad. Wiss. Berlin, 1845: 358). The genoholo-

¹ Received February 5, 1944.

type is *C. polystigma* Ehrenberg (*l.c.*, p. 368). The type specimen was examined. It is from Loandra, South Africa. The internal siphon is well shown and the genus should be placed as a synonym of *Bolivina* d'Orbigny, 1839.

Grammobotrys Ehrenberg, 1845 (Ber. preuss. Akad. Wiss. Berlin, 1845: 368). The genoholotype is *G. africana* Ehrenberg from Loandra, South Africa. The types were examined and the genus should be placed as a synonym of *Virgulinina* d'Orbigny, 1826.

Spiropleurites Ehrenberg, 1854 (Ber. preuss. Akad. Wiss. Berlin, 1854: 248). Of the two species named, only *S. nebulosus* Ehrenberg was figured (Mikrogeologie, 1854: pl. 35, pt. B, iv, fig. 7). The specimen from the Atlantic may possibly be a young form of *Globorotalia menardii* (d'Orbigny) although Sherborn's Index refers it to "*Pulvinulina repanda*," which is an *Eponides*. Its position must therefore remain doubtful.

Pleurites Ehrenberg, 1854. There are several species figured under this genus in 1854, the first of which is *P. cretae* Ehrenberg (Mikrogeologie, 1854: pl. 27, fig. 32). It is from the Cretaceous of Meudon, near Paris. Ehrenberg had written later under the original figure "*Globigerina cretacea*," but it is not this. A study of the type specimen shows it to have a smooth surface with the aperture and triserial arrangement of the chambers of *Bulimina*. It should therefore be placed as a synonym of *Bulimina* d'Orbigny, 1826.

Synspira Ehrenberg, 1854. The genoholotype, *S. triquetra* Ehrenberg, was figured (Mikrogeologie, 1854: pl. 29, fig. 47) from the Island of Moën. The single specimen at first appearance seems to be allied to *Nubecularia*, but it is apparently perforate and perhaps allied to *Spirillina*. From this single specimen the genus must remain doubtful.

Ceratospirulina Ehrenberg, 1858 (Monatsb. preuss. Akad. Wiss. Berlin, 1858: 11). The genoholotype is *C. sprattii* Ehrenberg (*l.c.*, p. 19). The type specimen is from 500 fathoms, in the Mediterranean between Malta and Crete. The species was originally called *mediterranea* in Ehrenberg's notes but later was crossed out and *sprattii* added above. On the original notes it was called *Ceratoloculina*. The later record as *Ceratospyrus sprattii* (Abh. Akad. Wiss. Berlin, 1872 (1873): pl. 11, fig. 7) is the same. The

early portion is definitely 5-chambered, and the generic names should be placed as synonyms of *Articulina* d'Orbigny, 1826.

Encorycium Ehrenberg, 1858 (Monatsb. preuss. Akad. Wiss. Berlin, 1858: 11, 19). The genoholotype is *E. nodosaria* Ehrenberg (*l.c.* p. 19) afterward figured by Ehrenberg (Abh. Akad. Wiss. Berlin, 1872 (1873): pl. 11, fig. 13). The specimen is well figured but evidently incomplete. Each chamber has a short internal neck, and the test as examined is clear, thin, and smooth. On the sheet of original drawings there are numerous notes later referring it to various genera, *Nodosaria*, *Fronicularia*, and *Glandulina*. From the evidence of the specimen it may questionably be referred to *Ellipsonodosaria* A. Silvestri, 1900, as a synonym.

Selenostomum Ehrenberg, 1858 (Monatsb. preuss. Akad. Wiss. Berlin, 1858: 12). Two species were named by Ehrenberg, *S. aegaeum* and *S. fimbriatum*. Both are Recent forms from the Aegean Sea. A study of the type specimens showed that the genus is a synonym of *Cassidulina* d'Orbigny, 1826.

Dexiopora Ehrenberg, 1858 (Monatsb. preuss. Akad. Wiss. Berlin, 1858: 309). The specimen figured as *D. triarchaea* Ehrenberg (*l.c.*, pp. 309, 337, pl. 1, fig. 10) is marked "untersilurischer Grünsand, Petersburg." Parker and Jones noted that it might be a *Globigerina*, but from an examination of the specimen it seems more like a concretionary form and so far as could be made out is without structure and the name should be allowed to lapse.

Spirocerium Ehrenberg, 1858 (Monatsb. preuss. Akad. Wiss. Berlin, 1858: 310). The genoholotype is *S. priscum* Ehrenberg (*l.c.*, pp. 310, 337, pl. 1, fig. 14). An examination of the type specimen shows it to be a globular mass of glauconite with no definite structure, and the name should be allowed to lapse.

Aspidodexia Ehrenberg, 1872 (Monatsb. preuss. Akad. Wiss. Berlin, 1872: 280). The genoholotype, *A. lineolata* Ehrenberg, was figured (Abh. Akad. Wiss. Berlin, 1872 (1873): pl. 3, fig. 4) from Recent Atlantic material. The original specimen was not found in the Ehrenberg collection, but the original figure was seen and the name had later been changed to *Aspidospira*. The latter is a synonym of *Anomalina* d'Orbigny, 1826. *Aspidodexia* is probably a synonym of *Globigerina* d'Orbigny, 1826.